an input configured to receive at least two measured intensity signals generated by the detection of at least two **[multiple]** wavelengths of light transmitted through body tissue having flowing blood, said intensity signals each having a first portion substantially dependent upon attenuation of said light due to arterial blood, [oxygen saturation] and during motion, a second portion substantially dependent upon the attenuation of said light due to motion induced noise;

[a Kalman filter that calculates an estimate of a physiological signal related to at least one of said intensity signals; and]

a processor responsive to the at least two intensity signals to determine an approximation of arterial oxygen saturation {tracks said portion] in the presence of motion induced noise [based upon said estimate to derive an oxygen saturation value].

40. The pulse oximeter of Claim 39, wherein said motion induced noise is substantially dependent on the attenuation of said light by venous blood in the tissue during motion [processor comprises a tracking module which tracks said portion by filtering said at least two intensity signals based upon said estimate].

B2

41. (Amended) The pulse oximeter of Claim 40, wherein said processor has a ratio module configured to derive said oxygen saturation [value] based on a ratio between said at least two measured intensity signals [after filtering in said tracking module].

SUB E1

42. (Amended) A physiological monitoring method comprising the steps of:

receiving at least two measured intensity signals generated by the detection of at least two wavelengths of light transmitted through body tissue, said at least two intensity signals having a first portion dependent on attenuation of said light due to arterial blood and a second portion dependent on attenuation of said light due to motion induced variation in the body tissue; and

determining arterial oxygen saturation during motion by filtering at least one of said intensity signals with a Kalman filter to generate an approximation of arterial oxygen saturation during motion, and selecting a resulting arterial oxygen saturation based upon knowledge about oxygen saturation in body tissue. [output that is an estimate of a physiological signal;].

[tracking a portion of each of said intensity signals through motion based upon said output; and

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deriving an oxygen saturation value from said portions.]

2 ~~43~~. (Amended) The method of Claim 1 ~~42~~, wherein said step of [tracking comprises] filtering comprises substantially removing the second portion of at least one of said at least two intensity signals [based upon said output].

3 ~~44~~. (Amended) The method of Claim 2 ~~43~~, wherein said step of [deriving] determining an arterial oxygen saturation [value] comprises at least the step of determining a ratio between said ~~at~~ least two measured intensity signals.

5 ~~45~~. (Amended) A pulse oximeter configured to determine arterial oxygen saturation of a living patient, said oximeter configured to connect to a pulse oximeter sensor having a source of light and a detector for said light, said source of light providing at least two wavelengths, said pulse oximeter comprising:

D2

an input configured to connect to said pulse oximeter sensor and receive at least two measured intensity signals based on said at least two wavelengths after transmission through the tissue of said living patient, each of said at least two measured intensity signals having a first portion substantially dependent upon attenuation of the light due to arterial blood [oxygen saturation], and during motion a second portion substantially dependent upon attenuation of the light dependent upon motion of the patient;

a Kalman filter which receives as an input at least one of said measured intensity signals, said Kalman filter having an output which provides an estimate of oxygen saturation [a physiological parameter signal] related to at least one of said measured intensity signals; and

a processor responsive to said estimate at an input [and at least one of said measured intensity signals at the input] to derive an oxygen saturation value representative of the arterial oxygen saturation of blood in said tissue during motion .

6 ~~46~~. (Amended) The pulse oximeter of Claim 5 ~~45~~, wherein said attenuation dependent upon motion of the patient represents attenuation due to the movement of venous blood [processor comprises a tracking module which follows said portions by filtering said at least two intensity signals based upon said estimate].

7 ~~47~~. (Amended) The pulse oximeter of Claim 6 ~~46~~, wherein said processor [comprises a ratio module configured to derive] determines said arterial oxygen saturation value based on

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D2

[a ratio between said at least two measured intensity signals after filtering in said tracking module] knowledge about arterial oxygen saturation and possible variation over time.

SUB E2

51. (Amended) A physiological monitor comprising an input configured to receive at least two measured intensity signals generated by the detection of [multiple] at least two wavelengths of light transmitted through body tissue, said intensity signals each having a portion indicative of at least one physiological parameter;

a Kalman filter responsive to said intensity signals, said Kalman filter attenuating selected frequencies present in said physiological signal, said frequencies [determined to comprise] comprising substantially motion noise in said physiological signals; and

D3

a processor responsive to the output of said filter to derive a physiological parameter based upon said output of said Kalman filter, wherein said processor further determines said physiological parameter based upon knowledge about the physiological parameter and possible variation over time.

9 ~~52~~. The [pulse oximeter] physiological monitor of Claim 8 ~~51~~, wherein said physiological parameter comprises blood oxygen saturation.

SUB E3

53. The physiological monitor of Claim 51, wherein said physiological parameters comprises heart rate.

11 ~~54~~. The physiological monitor of Claim 8 ~~51~~, wherein said physiological parameter comprises heart rate and blood oxygen saturation.

12 ~~55~~. The physiological monitor of Claim 8 ~~51~~, wherein said [Kalman filter operates on a least means squares analysis] motion noise is substantially dependent upon the movement of venous blood due to said motion.

SUB E4

D4

62. A method of determining oxygen saturation, said method comprising the steps of:

receiving an input of at least two measured intensity signal generated by the detection of at least two wavelengths of light transmitted through body tissues, said intensity signals each having a portion substantially dependent on the attenuation of said light due to arterial blood [oxygen saturation] and a portion substantially dependent upon attenuation due to venous blood during motion [the pulse in the body tissue];

adaptively filtering said intensity signals [with a multiple notch filter, said multiple notch filter attenuating selected frequencies in said signals];

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Calculating oxygen saturation <u>during motion</u> based upon the result of said filtering.

14 ~~63~~. The method of Claim 13 ~~62~~, wherein said step of calculating comprises the step of generating a plurality of values for oxygen saturation based upon said physiological signals and scanning said plurality of values to find at least one value indicative of [said] <u>arterial</u> blood oxygen saturation.

D4

15 ~~64~~. The method of Claim 13 ~~63~~, wherein said selection is based upon [expectations] <u>knowledge</u> about said physiological parameter [and expectations about said signal].

Please add the following new claims:

SUB B5

65. The pulse oximeter of Claim ~~39~~, wherein the processor comprises a Kalman filter.

66. The pulse oximeter of Claim 39, wherein the two measured intensity signals are derived from a time-modulated intensity signal representative of both intensity signals, the pulse oximeter further comprising a demodulator.

67. The pulse oximeter of Claim 66, further comprising a bandpass filter in the signal path for the intensity signals prior to the demodulator

68. The pulse oximeter of Claim 67, wherein the intensity signal is maintained in a single channel prior to input to the demodulator

D5

69. The pulse oximeter of Claim ~~68~~, further comprising:

a photodetector which generates said intensity signals; and

an amplifier coupled in the signal path for said intensity signals prior to the demodulator.

70. The pulse oximeter of Claim 39, further comprising a photodetector and a source of at least two wavelengths of light, wherein said photodetector originates said at least two intensity signals, and said at least two intensity signals represent attenuation of light of said at least two wavelengths due to transmission through the body tissue.

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4 ~~71~~. The physiological monitoring method of Claim ~~42~~, wherein said attenuation of light due to motion is substantially dependent upon the attenuation of said light by venous blood in the tissue during motion.

17 ~~72~~. A physiological monitor that computes arterial oxygen saturation in tissue material having arterial and venous blood, the physiological monitor comprising:

a light emitter which emits light of at least first and second wavelengths;

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a light detector responsive to light from said light emitter which has passed through body tissue having arterial and venous blood, said light detector providing at least first and second intensity signals associated with said at least first and second wavelengths, each of said first and second intensity signals having, during motion of the tissue, at least a first signal portion indicative of arterial blood and a second signal portion indicative of motion induced noise; and

a signal processor responsive to the first and second intensity signals to calculate arterial oxygen saturation without significant interference in the calculation from the motion induced noise portion of the first and second intensity signals.

14 ~~73~~. The physiological monitor of Claim 17 ~~72~~, wherein said motion induced noise is indicative of the attenuation due to venous blood in the tissue during motion.

D5

19 ~~74~~. The physiological monitor of Claim 18 ~~73~~, wherein the signal processor comprises an adaptive signal processor.

20 ~~75~~. The physiological monitor of Claim 19 ~~74~~, wherein said signal processor comprises an adaptive filter.

21 ~~76~~. The physiological monitor of Claim 17 ~~72~~, wherein said signal processor comprises an adaptive signal processor.

22 ~~77~~. The physiological monitor of Claim 21 ~~76~~, wherein said signal processor comprises an adaptive filter.

23 ~~78~~. The physiological monitor of Claim 22 ~~77~~, wherein said adaptive filter comprises a Kalman filter.

REMARKS

The Examiner rejected Claims 39-64. Applicants have deleted Claims 48-50 and 56-61. Claim 51 has been amended to incorporate the limitations in Claim 56. Finally, Claims 58 and 60 have been amended to properly refer to Claim 51.

Rejection under 35 U.S.C. § 112

The Examiner rejected claims 56 – 61 under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains. Specifically, the Examiner suggested that the specification did not teach a processor that determines a physiological parameter based upon "expectation" about the ranges and possible variation over time. The specification teaches

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